

1. A fuselage comprising:

a frontal fuselage portion that leads through a fluid;

an outer fuselage surface relating with said frontal fuselage portion that receives fluid flow thereon;

5 at least one fluid flow regulator featured and operable with said outer fuselage surface and extending at least a partial distance around said fuselage, said fluid flow regulator comprising:

a leading surface;

a trailing surface;

10 a pressure recovery drop extending a pre-determined distance between said leading and trailing edges to form a down step, said pressure recovery drop comprising at least one drop face of a calculated distance, said fluid flow regulator functioning to regulate existing pressure gradients along said fuselage to optimize and equalize

15 said fluid flow and to reduce the separation potential of said fluid, wherein said regulation of said pressure gradients positively influences the flow properties and behavior of said fluid across said fuselage, and thus the performance of the craft comprising said fuselage;

20 a sub-atmospheric barrier generated at the base of said drop face as said fluid encounters and flows over said pressure recovery drop, said sub-atmospheric barrier comprising a low pressure area of fluid molecules having decreased kinetic energy that serve as a cushion

between said higher kinetic energy fluid molecules in said fluid and the molecules at said outer fuselage surface to facilitate laminar flow and assist in the reduction of the separation potential of said fluid; and

5 a trailing edge that defines and extends from the base of said pressure recovery drop that provides a trailing flow boundary for said fluid.

2. The fuselage of claim 1, wherein said pressure recovery drop is positioned at or proximate an optimal pressure recovery point defined as the location(s) about said surface 10 at which there is an imbalanced or unequal pressure gradient forward and aft of said fluid, thus creating an adverse pressure about said fuselage, which adverse pressure gradient induces friction and pressure drag that ultimately increases the separation potential of said fluid.

15 3. The fuselage of claim 1, wherein said pressure recovery drop is oriented in a position selected from the group consisting of perpendicular to the direction of flow of said fluid, substantially perpendicular to the direction of flow of said fluid, on an angle with respect to said direction of flow of said fluid, parallel or substantially parallel to the direction of flow of said fluid, and any combination of these.

20 4. The fuselage of claim 1, wherein said pressure recovery drop comprises a formation selected from the group consisting of linear, curved, spline, and any combination of these.

5. The fuselage of claim 1, wherein said fluid flow regulator extends annularly around said fuselage.

5 6. The fuselage of claim 1, wherein said pressure recovery drop extends entirely across said outer fuselage surface.

7. The fuselage of claim 1, wherein said pressure recovery drop extends about only a portion of said outer fuselage surface.

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8. The fuselage of claim 1, wherein said outer fuselage surface features a plurality of fluid flow regulators that function together to regulate, influence, and control fluid flow and its properties and characteristics across said outer fuselage surface.

15 9. The fuselage of claim 1, wherein said fluid flow regulator is a dynamic fluid flow regulator capable of adjusting, on demand, with varying design constraints, flow characteristics, environmental conditions, and operational situations pertaining to said fluid, said object, and any combination of these during

20 10. The fuselage of claim 9, wherein said dynamic fluid flow regulator comprises at least one selectively adjustable component, wherein said adjustable components are selected from a movable leading edge, a movable pressure recovery drop, and a movable

trailing edge, each capable of adjusting the height of said drop face and said pressure drop.

11. The fuselage of claim 1, wherein said fluid flow regulator comprises means for
5 effectuating vector positioning about said surface.

12. The fuselage of claim 1, wherein said fluid flow regulator comprises at least one component that oscillates with varying situations and conditions to vary the height of said pressure recovery drop.

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13. The fuselage of claim 1, wherein said fluid flow regulator is integrally formed with said outer fuselage surface.

14. The fuselage of claim 1, wherein said leading edge, said pressure recovery drop,
15 and said trailing edge of said fluid flow regulator are each embodied in a fluid flow regulator device that is removably attachable to an existing outer fuselage surface to allow said existing outer fuselage surface to feature one or more fluid flow regulators.

15. The fuselage of claim 1, wherein said pressure recovery drop comprises a
20 plurality of drop faces to magnify the influence of fluid flow regulator on said fluid.

16. The fuselage of claim 1, wherein said fuselage comprises a fuselage of a moving body or craft selected from the group consisting of a rocket, an aircraft, a submarine, a missile, a torpedo, and any other similar bodies.

5 17. The fuselage of claim 1, wherein said pressure recovery drop comprises an orthogonal design.

18. A moving body comprising:

at least one surface subject to external flow of fluid;

at least one fluid flow regulator featured and operable with said surface, said fluid

flow regulator comprising:

5 a leading surface;

a trailing surface;

a pressure recovery drop extending a pre-determined distance between

said leading and trailing edges to form a down step, said pressure

recovery drop comprising at least one drop face of a calculated

10 height, said fluid flow regulator functioning to regulate existing

pressure gradients along said fan blade to optimize and equalize

said fluid flow and to reduce the separation potential of said fluid,

wherein said regulation of said pressure gradients positively

influences the flow properties and behavior of said fluid across

15 said surface, and the performance of said moving body;

a sub-atmospheric barrier that is generated as said fluid encounters and

flows over said pressure recovery drop, said sub-atmospheric

barrier comprising a low pressure area of fluid molecules having

decreased kinetic energy that serve as a cushion between said

20 higher kinetic energy fluid molecules in said fluid and the

molecules at said surface to facilitate laminar flow and assist in the

reduction of the separation potential of said fluid; and

a trailing edge that defines and extends from the base of said pressure recovery drop that provides a trailing flow boundary for said fluid.

19. The moving body of claim 18, wherein said moving body comprises the fuselage
5 of an airplane or other similar aircraft.

20. The moving body of claim 18, wherein said moving body comprises the fuselage
of rocket.

10 21. The moving body of claim 18, wherein said moving body comprises the body or
hull of a submarine.

22. The moving body of claim 18, wherein said moving body comprises the body of
an automobile.

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23. The moving body of claim 18, wherein said moving body comprises the hull of a
boat, ship, or other similar watercraft.

24. The moving body of claim 18, wherein said moving body comprises the fuselage
20 of a missile.

25. The moving body of claim 18, wherein said pressure recovery drop comprises an
orthogonal design.

26. A method of influencing fluid flow by regulating pressure gradients about a moving body and for reducing fluid separation about said moving body, said method comprising the steps of:

obtaining a moving body having at least one surface subject to fluid flow;

5 featuring at least one fluid flow regulator with said surface, said fluid flow regulator comprising:

a pressure recovery drop having at least one drop face formed between a leading and trailing edge and having an identified and calculated distance;

10 subjecting said moving body a fluid, such that said fluid is caused to move about said moving body, and particularly said surface; and

causing said fluid to encounter said fluid flow regulator, such that said pressure recovery drop induces a sudden drop in pressure as said fluid flows over said fluid flow regulator, wherein a sub-atmospheric barrier is created at the base of said drop face, said fluid flow regulator functioning to optimize fluid flow about said object, thus increasing the performance of said moving body in said fluid.

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27. The method of claim 26, wherein said step of featuring comprises positioning said fluid flow regulator at an optimal pressure recovery point as the location(s) about said surface at which there is an imbalanced or unequal pressure gradient forward and aft of said fluid, thus creating an adverse pressure about said moving body, which adverse

pressure gradient induces friction and pressure drag that ultimately increases the separation potential of said fluid.

28. The method of claim 26, wherein said step of featuring comprises positioning said fluid flow regulator in an orientation selected from the group consisting of perpendicular to the direction of flow of said fluid, substantially perpendicular to the direction of flow of said fluid, on an angle with respect to said direction of flow of said fluid, parallel or substantially parallel to the direction of flow of said fluid, and any combination of these.
- 10 29. The method of claim 27, further comprising the step of repositioning said fluid flow regulator as said optimal pressure recovery points change in response to varying conditions surrounding said fluid flow.
- 15 30. The method of claim 26, further comprising the step of varying said pressure recovery drop, and particularly said height of said drop face, both consistently and inconsistently, along the length of said pressure recovery drop in response to changing conditions.
- 20 31. The method of claim 26, wherein said step of causing said fluid to encounter said fluid flow regulator has the effect of optimizing fluid flow and the performance of said object within said fluid, said fluid flow regulator:
regulating the pressure gradients that exist along said surface by reducing the pressure drag at various locations along said surface, as well as the

pressure drag induced forward and aft of said moving body, via a pressure recovery drop;

increasing pressure recovery and pressure recovery potential as a result of regulating said pressure gradients and reducing said pressure drag;

5 reducing friction drag along said surface as a result of increasing said pressure recovery; and

decreasing fluid separation and fluid separation potential as a result of said reducing friction drag.

10 32. The method of claim 26, wherein said moving body comprises the fuselage of an airplane or other similar aircraft.

33. The method of claim 26, wherein said moving body comprises the fuselage of a rocket.

15 34. The method of claim 26, wherein said moving body comprises the body or hull of a submarine.

35. The method of claim 26, wherein said moving body comprises the body of an 20 automobile.

36. The method of claim 26, wherein said moving body comprises the hull of a boat, ship, or other similar watercraft.

37. The method of claim 26, wherein said moving body comprises the fuselage of a missile.